

WHAT IS CLAIMED IS:

1. For use in a semiconductor testing machine of the type having a plurality of test probes configured to contact the surface of a semiconductor wafer to test one or more dies formed thereon, an apparatus for cleaning the test probes, comprising:

a roller-support arm; and  
a cylindrical roller supported by the roller-support arm,  
the roller having an outer surface comprising a sticky material,  
wherein debris on the probes will adhere to the sticky material as the roller is rolled across tips of the probes.

2. The apparatus of claim 1, wherein the cylindrical roller comprises an inner cylindrical portion, and wherein the sticky material is disposed on a peripheral surface of the inner cylindrical portion.

3. The apparatus of claim 1, wherein the roller-support arm is pivotally connected to a wafer chuck of the testing machine, the wafer chuck for supporting the semiconductor wafer to be tested.

4. The apparatus of claim 3, wherein:  
an outer circumference of the roller is below a horizontal plane of the wafer when the roller-support arm is in a first position, thereby enabling the wafer chuck to be maneuvered without the roller engaging the probe tips; and  
at least a portion of the outer circumference of the roller is above the horizontal plane of the wafer and aligned with a horizontal plane of the probe tips when the roller-support arm is in a second position, thereby enabling the outer surface of the roller to engage with and roll across the probes tips as the wafer chuck is moved in a horizontal direction.

5. The apparatus of claim 1, wherein the probes being cleaning comprise at least one of the following:

- needles;
- vertical probes;
- cobra probes;
- L-type probes;
- plunger probes;
- spring probes; and
- contact bump probes formed on a membrane.

6. For use in a semiconductor testing machine of the type having a plurality of test probes configured to contact the surface of a semiconductor wafer to test one or more dies formed thereon, an apparatus for cleaning the test probes, comprising:

- a roller core; and
- a sticky material disposed about an outer surface of the roller core;

wherein debris on the probes will adhere to the sticky material when the sticky material is engaged against tips of the probes.

7. The apparatus of claim 6, wherein the roller core spins about its longitudinal axis, and wherein different portions of the sticky material engage against the tips of the probes as the roller core spins.

8. The apparatus of claim 6, wherein the roller core is pivotally supported by an arm adapted to engage the sticky material against the tips of the probes.

9. The apparatus of claim 8, wherein friction between the sticky material and the tips of the probes causes the roller core to spin as the arm moves in the horizontal direction.

10. The apparatus of claim 8, wherein the arm is attached to a wafer chuck.
11. The apparatus of claim 8, wherein the arm is attached to a maneuvering mechanism.
12. The apparatus of claim 8, wherein the arm extends between a pair of tracks, and wherein the sticky material engages the tips of the probes as the arm moves horizontally along the tracks.
13. An apparatus for cleaning probes that extend from a probe card used for testing one or more semiconductor dies, comprising:
  - a loosening means for loosening debris from the probes; and
  - a roller having an outer surface comprising a sticky material,wherein the loosened debris will adhere to the sticky material as the outer surface of the roller is rolled across tips of the probes.
14. The apparatus of claim 13, wherein the loosening means comprises a second roller having an outer surface comprising an abrasive material, and wherein the debris is loosened from the probes as the outer surface of the second roller is rolled across the tips of the probes.
15. The apparatus of claim 13, wherein the loosening means comprises a block having an abrasive top surface, and the debris is loosened from the probes as the abrasive top surface of the block is moved in a horizontal direction along the tips of the probes.
16. The apparatus of claim 13, wherein the loosening means comprises an abrading pad, and the debris is loosened from the probes as the abrading pad is repeatedly moved in a vertical direction against and away from the tips of the probes.

17. The apparatus of claim 13, wherein the loosening means comprises a second roller having a bristled outer surface, and wherein the debris is loosened from the probes as the outer surface of the second roller is rolled across the tips of the probes.

18. The apparatus of claim 13, wherein the loosening means comprises a block having an bristled top surface, and the debris is loosened from the probes as the bristled top surface of the block is moved in a horizontal direction along the tips of the probes.

19. An apparatus for cleaning tips of probes used for testing dies of a semiconductor wafer, comprising:

a roller having a sticky outer surface; and

an arm for supporting the roller and for engaging the roller against the tips of the probes,

wherein debris adhering to the tips of the probes is transferred to the sticky outer surface of the roller as it is rolled along the tips of the probes.

20. An apparatus for cleaning tips of probes used for testing dies of a semiconductor wafer, comprising:

a roller having an electrostatic outer surface; and

an arm for supporting the roller and for engaging the roller against the tips of the probes,

wherein debris adhering to the tips of the probes is transferred to the electrostatic outer surface of the roller as it is rolled along the tips of the probes.

21. An apparatus for cleaning tips of probes used for testing dies of a semiconductor wafer, comprising:

a roller having an outer surface including micro-pores, said micro-pores containing a cleaning agent; and

an arm for supporting the roller and for engaging the roller against the tips of the probes,

wherein the tips of the probes are cleaned by said cleaning agent as the outer surface of the roller is rolled along the tips of the probes.

22. A method for cleaning test probes configured to contact the surface of a semiconductor wafer to test one or more dies formed thereon, the method comprising the steps of:

(a) maneuvering a roller having a sticky outer surface such that the sticky outer surface is engaged against tips of the probes; and

(b) rolling the sticky outer surface along the tips of the probes to thereby transfer debris adhering to the probes to the sticky outer surface.

23. The method of claim 22, further comprising the following step prior to step (a):

loosening the debris by scraping the tips of the probes against an abrasive surface.

24. The method of claim 23, wherein the loosening step comprises the following steps:

maneuvering a second roller having an abrasive outer surface such that the abrasive outer surface is engaged against the tips of the probes; and

rolling the abrasive outer surface along the tips of the probes to thereby loosen the debris from the probes.

25. The method of claim 23, wherein the loosening step comprises maneuvering an abrasive surface in a horizontal direction along the tips of the probes to thereby loosen the debris from the probes.

26. The method of claim 23, wherein the loosening step comprises repeatedly moving an abrasive surface in a vertical direction against and away from the tips of the probes to thereby loosen the debris from the probes.

27. The method of claim 22, further comprising the following step prior to step (a):

loosening the debris by brushing the tips of the probes against a bristled surface.

28. The method of claim 27, wherein the loosening step comprises the following steps:

maneuvering a second cylindrical roller having a bristled outer surface such that the bristled outer surface is engaged against the tips of the probes; and

rolling the bristled outer surface along the tips of the probes to thereby loosen the debris from the probes.

29. The method of claim 27, wherein the loosening step comprises maneuvering a bristled surface in a horizontal direction along the tips of the probes to thereby loosen the debris from the probes.

30. The method of claim 22, wherein the probes being cleaning comprise at least one of the following:

needles;

vertical probes;

cobra probes;

L-type probes;

plunger probes;

spring probes; and

contact bump probes formed on a membrane.

31. A method for cleaning test probes configured to contact the surface of a semiconductor wafer to test one or more dies formed thereon, the method comprising the steps of:

(a) maneuvering a roller having an electrostatic outer surface such that the electrostatic outer surface is engaged against tips of the probes; and

(b) rolling the electrostatic outer surface along the tips of the probes to thereby transfer debris adhering to the probes to the electrostatic outer surface.

32. The method of claim 31, further comprising the following step prior to step (a):

loosening the debris on the probes.

33. A method for cleaning test probes configured to contact the surface of a semiconductor wafer to test one or more dies formed thereon, the method comprising the steps of:

(a) maneuvering a roller having an outer surface such that the outer surface is engaged against tips of the probes, wherein said outer surface includes micro-pores containing a cleaning agent; and

(b) rolling the outer surface along the tips of the probes to thereby clean the probes with said cleaning agent.

34. An apparatus for cleaning tips of probes used for testing dies of a semiconductor wafer, comprising:

a roller having an outer surface; and

an arm for supporting the roller and for engaging the roller against the tips of the probes,

wherein the tips of the probes are cleaned when the outer surface of the roller is rolled along the tips of the probes.

35. A method for cleaning test probes configured to contact the surface of a semiconductor wafer to test one or more dies formed thereon, the method comprising the steps of:

(a) maneuvering a roller having an outer surface such that the outer surface is engaged against tips of the probes; and

(b) rolling the outer surface along the tips of the probes to thereby clean the probes.

36. An apparatus for cleaning tips of probes used for testing dies of a semiconductor wafer, comprising:

first and second rollers for supporting a sheet of material there-between, wherein the sheet of material has a sticky outer surface; and

a maneuvering mechanism to maneuver the first and second rollers such that the sticky outer surface faces the tips of the probes,

whereby debris is transferred from the tips of the probes to the sticky surface of the sheet of material when the maneuvering mechanism moves the sheet of material toward and against the tips of the probes, and

whereby a previously unexposed portion of the sheet of material is rolled from one of the first and second rollers when a previously exposed portion of the sheet of material is rolled about the other one of the first and second rollers.

37. An apparatus for cleaning debris from a semiconductor wafer, comprising:

a roller-support arm; and

a cylindrical roller supported by the roller-support arm,

the roller having an outer surface comprising a sticky material,

wherein debris on the wafer will adhere to the sticky material as the roller is rolled across the wafer.



38. The apparatus of claim 37, wherein debris on spring contacts that extend from the wafer adhere to the sticky material as the roller is rolled across the spring contacts.

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